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THE HAND REFRACTOMETER FOR PREHARVEST ANALYSIS OF SUGARCANE.

By R. L. Davis, Agronomist.

The hand refractometer has been adopted in Hawaii for making field analyses of sugarcane prior to harvest. The hand refractometer gives the total solids in the cane juice, and this reading, in turn, approximates the sucrose content. The purity cannot be determined by the hand refractometer, but experiments conducted at the Hawaii Sugar Planters' Experiment Station, however, show a constant relation between the sucrose and purity of a given variety of cane. If the sucrose content is high, the purity is also, and vice versa. These Hawaiian experiments also showed that the readings of the hand refractometer were quite dependable for preharvest sampling, closely approximating the hand-mill analyses.

The hand refractometer consists of a short telescope with a glass prism at one end and an eyepiece covered with red glass at the other. The glass prism is enclosed in a hexagonal chamber with a hinged cover. It is furnished in a leather case with a shoulder strap, and, barely exceeding a pound in weight, it is easy to transport.

To operate the refractometer the prism chamber is thrown open, and a few drops of cane juice placed on the black inner ground glass surface of the cover. The instrument is closed, and readings taken looking thru the red glass. The scale on the eyepiece of the telescope gives the readings direct. Correction for temperature may be made by use of a thermometer, but this may not be necessary if the readings are always taken at about the same time of day.

The Hawaiian method of collecting the sample is as follows:- A small section is taken from a central joint of each of 20 to 25 canes chosen at random in different parts of the field. Pliers are used to squeeze the juice from these sections. The juice is mixed, and a few drops placed on the ground glass of the refractometer. The refractometer is then closed, and, looking towards the sunlight, the observation is taken at the boundary line between the dark and light portions of the scale.

At Mayaguez it has been found convenient to collect the sample by means of an ice pick and tissue paper. The ice pick is thrust thru the center of the canes and worked up and down to force out the juice, which is absorbed by the tissue paper. Juice from the centers of 5 or 6 canes is collected on the tissue paper and then squeezed out onto the ground glass. A fresh piece of tissue paper is used for each sample. Four or five readings are taken of samples collected in this way in different parts of the field and the results are averaged to approximate the sucrose for the whole field.

Preliminary trials made on a Mayaguez field of P. O. J. 2725 gave the following readings. Samples were collected from 20 to 25 canes.

Hand refractometer
January 15, 1930
Percentage of
total solids
14.0
15.9
16.6
16.6
<u>15.6</u>
Average... 15.74

The hand-mill analysis made from the same stools one month later gave a sucrose of 16.71 per cent., which, allowing for the longer ripening period, is approximately the same result as the readings secured with the hand refractometer.

DEPARTAMENTO DE JUSTIÇA
PROLÉTARIADO DA VILA BOA

Em virtude da necessidade de se organizar para a luta de classe, é preciso que os trabalhadores se organizem em sindicatos e que estes sindicatos se unam em federações. A organização sindical é a base da luta de classe. É preciso que os sindicatos se organizem para lutar contra o capitalismo, para lutar contra o imperialismo, para lutar contra o fascismo, para lutar contra o colonialismo, para lutar contra o racismo, para lutar contra o sexismo, para lutar contra o patriarcado, para lutar contra o capitalismo, para lutar contra o imperialismo, para lutar contra o fascismo, para lutar contra o colonialismo, para lutar contra o racismo, para lutar contra o sexismo, para lutar contra o patriarcado.

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Assinatura: [Signature]

Dia: 10 de junho de 1985

Hand-refractometer readings were also taken at Mayaguez on 50 stools of first-year seedlings. The data were sorted according to the percentage of total solids found. The averages for the refractometer readings, as given in the following table, correspond closely with hand-mill analyses made on the same stools one month later; those seedlings that gave a hand-refractometer reading of over 16, with very few exceptions also gave a hand-mill analysis equaling or exceeding this figure.

Number of stools sampled	Total number of canes	Hand refractometer			Hand-mill analyses Feb. 15, 1930
		Jan. 15, 1930		Average reading	
		Range of readings	Percentage of total solids	Percentage of sucrose	
11	55	12 to 13.9	13.38	15.30	
14	70	14 to 14.9	14.47	15.66	
13	65	15 to 15.9	15.36	16.58	
5	25	16 to 16.9	16.61	17.04	
7	35	17 and above	17.80	17.02	

The hand refractometer is not an expensive piece of equipment and should prove especially useful to sugar centrals having scattered plantings from which it is difficult to handle and ship large, long cane samples to the main office for hand-mill analysis.

